



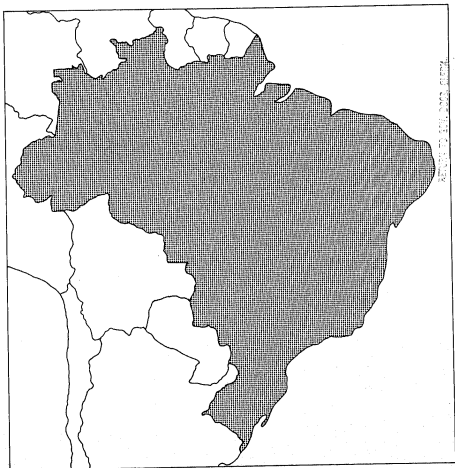
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Brazil: Agricultural and Trade Policies

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FOREWORD

This report provides an overview of Brazil's agricultural and trade policies. It also focuses on Brazil's trade relations with the United States and on opportunities for expanded U.S. trade with Brazil. Such an expansion would help to reduce the overall U.S. trade deficit with Brazil. This trade deficit totaled \$1.3 billion in 1980.

The source materials cited in the bibliography have been indispensable in the preparation of this report. Foremost among them are reports from the Office of the U.S. Agricultural Counselor in Brazil.

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BRAZIL: BASIC FACT SHEET

Geography

Area: 8,521,100 sq. km.

Cities: Capital—Brasília. Other cities with more than 1 million inhabitants: São Paulo, Rio de Janeiro, Belo Horizonte, Porto Alegre, Salvador, Recife, Fortaleza.

Climate: Ranging from tropical in the north to temperate in the south. Rainfall ranges from 20 to over 80 inches annually—from drought-stricken in the northeast to rainforest in the Amazon region.

Terrain: Mostly highlands except for the Amazon Basin floodplain; grassy plains in the extreme south; and a very small coastal plain not more than 100 miles wide. Most mountain ranges border the coast. Highest elevation is just over 9,000 feet.

Vegetation: Mostly woodlands, ranging from tropical rainforest to scrub. Some grassy plains in the south.

People

Population: 124 million (Jan. 1981)

Annual Population Growth: 2.3 percent (1980)

Ethnic Divisions: 60 percent white, 30 percent mixed, 8 percent black, 2 percent Indian (1976)

Religion: 93 percent Roman Catholic

Language: Portuguese

Literacy: 83 percent of population 15 years or older.

Work Force: 44.2 million (1980)

Government

Type: Military-backed federal republic

Constitution: Latest adopted—1967

Political Subdivisions: 22 states, 3 territories, 1 federal district

Budget: Revenues—\$20.2 billion; expenditures—\$19.3 billion (1979)

Economy

GDP: \$236.7 billion (1980)

Annual GDP Growth Rate: 8 percent (1980)

Mineral Resources: Iron ore, manganese, gold, tin, titanium, tungsten, lead, copper, natural fertilizers, precious, and semiprecious stones.

Agriculture: Coffee, sugar, cocoa, corn, manioc, soybeans, peanuts, cattle.

Industry: Textiles, chemicals, cement, lumber, steel, motor vehicles, and aircraft.

Trade: Exports—\$20.1 billion (1980); coffee, manufactures, iron ore, cotton, soybeans, sugar, wood, cocoa, beef, shoes. Major partners—U.S., EC. Imports—\$23.0 billion (1980); machinery, chemicals, pharmaceuticals, petroleum, wheat, copper, aluminum. Major partners—Saudi Arabia, U.S., EC.

Source: U.S. Department of State, *Background Notes* (in draft), 1981; Bureau of the Census, U.S. Department of Commerce; and Foreign Agricultural Service, U.S. Department of Agriculture.

BRAZIL: AGRICULTURAL AND TRADE POLICIES

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INTRODUCTION

size of Brazil's economy, population, and land mass guarantees it a place of prominence in the world community. At the same time, its forward-looking economy has gained Brazil a role as spokesman for other newly industrialized and developing countries as well. These facts, in addition to Brazil's geographic closeness and economic ties with the United States, make it a nation of particular importance to this country.

Brazil is the world's fifth largest country in area and the sixth most populous after China, India, the Soviet Union, the United States, and Indonesia. In Latin America it is by far the largest and most populous country. One in three Latin Americans is a Brazilian. In the last two decades Brazil has been able to develop economic muscle commensurate with its size and population. It is now the world's eighth largest market economy, and if current trends continue, it will be the world's sixth largest by 1985. In addition, Brazil now ranks thirteenth among world importers and fifteenth among world exporters. Brazil is unquestionably one of the leading newly developed countries in today's world.

Importance of Brazilian Agricultural Commodities

Brazil's current standing among the world's largest market economies is not a result of industrialization alone. Brazil has received a hefty portion of its economic miracle with funds raised from its large and prosperous agricultural sector. Brazil is one of the largest exporters of agricultural products in the world. Agriculturally based products provide over half of Brazil's export earnings. Thus, agriculture has been and will continue to be a key contributor to Brazil's growth.

Because of agriculture's position of key importance, it has traditionally received particular attention from the Brazilian Government, which has taken an active role in encouraging development. Policy instruments used have consisted largely of subsidized credit to help finance production costs. Government-enforced minimum price levels on agricultural commodities sold domestically.

The current trend is toward even greater emphasis on agriculture. There is some indication that in the next few years, indeed governmental concern will be shown for subsistence

and small farmers who have not benefited from past policies to the same degree as large commercial farmers.

Physical characteristics

Brazil's large land area—extending from the tropical north to the temperate south, and from the Amazon basin to the higher altitudes of the Serra do Espinhaço—is subject to a wide range of climatic, rainfall, and temperature changes. This permits a variety of agricultural enterprises—the cultivation of tropical products such as cocoa and sugar, as well as temperate climate crops and a large livestock industry. However, the vagaries of weather in Brazil inject an unusually large number of unknown factors, with proportionately high risks in the production, harvesting, and marketing of agricultural commodities.

Brazil's 3.3 million square miles can be separated into five major geographic regions:

The North is dominated by the Amazon basin which covers nearly one-half of Brazil. Sliced by the Equator, much of this region consists of humid, tropical rain forest. This is Brazil's most underdeveloped region but one which is growing rapidly and steadily.

The rubber boom of the late 19th and early 20th centuries brought temporary prosperity to the North. The large cities of Belém and Manaus grew up then. Rubber still contributes to the economy of the North, as do other tropical products such as palm oils, nuts and hardwoods. An inhospitable climate, poor soils, and a still very small population make the area unsuitable for row crops, but tree crops, especially palm oil, hold promise for the future.

The Northeast of Brazil is characterized by two contrasting geographic conditions. The coastal fringe, like the Amazon basin, is humid and tropical, while the interior is subject to extreme fluctuations in rainfall, earning it the name "the drought polygon."

The coastal region was one of the earliest population centers in Brazil and much of the Northeast's present-day agricultural production still comes from the large plantations which flourished during the colonial period. Unfortunately, this traditional landholding pattern has hindered the modernization

of the agricultural sector in the Northeast. Sugar, cocoa, and other tropical and semitropical export crops are the principal money-carners for the region.

The interior, or "the drought polygon", has been the target of numerous national and international infrastructural development projects. Most of these have aimed at improving irrigation and some have been fairly successful. Drought, however, continues to be a severe problem.

The Center-West of Brazil is an infertile, rolling scrubland savannah called the Cerrados. The Cerrados traditionally have been very lightly populated but are now growing very quickly. Substantial progress has been made in the campaign to develop this region.

The building of Brasília was one of the first steps and perhaps the most significant move toward shifting population and attention to the region. The Federal District, Brasília, is now a booming area of over a million people.

Long a land of cowboys and miners, the frontier Center-West can be looked to as a huge agricultural resource for the future. Most of the farming in the area now is subsistence crops (rice, corn, and beans), but the region does produce livestock and cotton for the cash market. It has been clearly demonstrated that, with proper technology, large-scale agricultural production in the Cerrados is viable.

The Southeast is the most heavily industrialized area of the country and contains Brazil's two largest cities, São Paulo and Rio de Janeiro. Characterized by rolling, hilly uplands, the region provides favorable soil conditions and climate for agriculture. It is also in the Southeast that technology is most advanced, labor is most readily available, and productivity is highest. Important commodities include coffee, sugar, oranges, and dairy products.

Like the Southeast, the South of Brazil is well developed economically. Its terrain is more varied, though, ranging from jungle-covered river valleys to rolling grasslands to forested highlands. Located farthest from the Equator, the South's agricultural advantages lie in temperate climate crops such as wheat and soybeans. As in neighboring Argentina and Uruguay, the livestock industry is also important.

The South of Brazil was settled late in the 19th century by European emigrants, primarily from Italy and Germany. Their heritage has given this region a unique cultural flavor.

Population

In spite of the huge agricultural sector, Brazil's population of 119 million (1980) is heavily concentrated in urban

areas. São Paulo, Rio de Janeiro, Belo Horizonte, and Fortaleza claim the two largest, with 11 million and 9 million respectively. The São Paulo corridor by

The 1980 census indicated that the rate of growth of the Brazilian population during the preceding decade reached its lowest level in 40 years, surprising many demographers. Even so, at an annual rate of 2.4 per cent, 3 million people are added to the population each year. With one half of Brazilians aged 18 years or younger, the expansion will undoubtedly continue.

Currently, about two-thirds of Brazilians live in urban areas. The immigration is not entirely in that direction, however. The Amazon wilderness has attracted significant numbers of people over the past decade, although the numbers are still small compared with the eastern seacoast. The territory of Rondônia, for example, quadrupled its population to 500,000 in the 1970's. On the other hand, the slowest rate of growth was recorded in the South where a severe frost in 1975 almost destroyed the coffee crop. The state of Paraná lost 900,000 residents due to outmigration during the decade.

Farms

In 1975 there were 5 million farms in Brazil. These farms covered approximately 38 percent of Brazil's land surface for a total of about 324 million hectares. In Brazil farm sizes vary greatly as do farming techniques. The larger farms are located mostly in the Southeast where most commercial operations are, the Northeast where there are still large plantations, and the Center-West where there are extensive cattle ranches and large, highly mechanized crop operations. Small farms, on which traditional techniques are still employed, are located for the most part in the north-northeast and southern regions. Most small farms are involved in the production of beans, rice, and corn, the main food staples of many Brazilians.

On larger farms in the Southeast there is a seasonal shortage of labor and a good deal of the work is done by hired laborers. In some areas subsistence farmers obtain additional income by working on larger, nearby farms. Also, in several areas of the country farmwork is still done by sharecroppers or tenant farmers with limited rights to the land. In the wheat and soybean areas of the South, where many of the farms are small or medium-sized, most of the work is done by the owner and family members.

Land ownership patterns in Brazil are heavily skewed. In 1972, 75 percent of all farmowners had holdings of less than 50 hectares. Farmers in this category controlled only 13 percent of the usable farmland. The remaining 87 percent of Brazil's usable farmland was controlled by only 25 percent of the country's farmowners. In the West, these large land holdings are often used for extensive cattle raising.

The use of modern technology is unevenly divided as well. In 1975, 94 percent of the tractor fleet and 92 percent of all fertilizer use was in the Center-South. As a result, the disparity in farm productivity is acute.

Government and Economy

The Government of Brazil is headed by President João Figueiredo who took office in March 1979 for a 6-year term. Although technically a Federal Republic, the government is

strongly centralized with the President holding broad powers. The present system was instituted after a coup d'etat in 1964 put the military in charge and over the years more and more power has been devolved to the presidency. President Figueiredo has made several moves toward dismantling this centralization, a process known widely as the political "abertura" or opening. There is optimism that the abertura will lead to renewed political freedoms and a more democratic system.

The government, however, is beset by severe balance of payments problems. The current account deficit for 1980 is estimated at US\$12.9 billion, up from \$10.7 billion in 1979. Foreign exchange reserves at the end of 1980 totaled \$6.9 billion, the lowest level since 1976. Annual debt service stood at a record \$12.6 billion and Brazil's total medium and long-term foreign debt, one of the largest in the third world, reached a record \$54 billion.

In order to deal with these problems, the Government of Brazil has launched a program of unorthodox, gradualist policies to slow economic growth without provoking a recession. Strict fiscal and monetary measures have been taken to cut back spending in nonessential areas while priming key priority sectors like agriculture and exports.

A "package" of economic policies was introduced December 1979 by the powerful Planning Minister Antonio Delfim Neto. These included a 30-percent devaluation of the cruzeiro, as well as other measures designed to boost exports and constrain imports, reduce monetary growth, and increase government tax revenues.

Since December 1979, the push to reduce the deficit in the balance of trade has continued. "Crawling peg" devaluations, begun in the late 1960's, totalling almost 50 percent in 1980. Tougher restrictions on imports have been imposed. Exporters were asked to pledge to increase their sales abroad, often by as much as 30 to 40 percent over the previous year.

Short-term results of the plan have been mixed, although goals were for the most part deliberately vague. It was ex-

pected, however, that the rate of economic growth in the first year would be held to 5 or 6 percent. The actual rate in 1980 was 8.5 percent. A slight inflationary effect was predicted, but prices rose 110 percent, compared to 77 percent in 1979. On the bright side, an export goal of \$20 billion for the year was set and reached, representing a 30-percent increase over 1979. But in spite of the boost in exports, the trade deficit is expected to be the highest since 1975.

Brazil's reputation as an economy to watch was earned during the 6-year period 1968-1974, when the Brazilian "economic miracle" was widely discussed and analyzed around the world. During the period, real annual GDP growth rates averaged more than 10 percent and at no time fell below 9 percent. However, growth fell to 5.6 percent in 1975 and has been fluctuating up and down ever since.

One of the primary causes of Brazil's economic problems is its heavy dependence on imported petroleum. In 1980, over 40 percent of its import payments went to finance purchases of crude oil. This severe constraint has led Brazil to explore alternative sources of energy.

Although it seems remarkable that a country of Brazil's proportions should be almost entirely without oil reserves, exploration up until now has discovered only a few sites with modest supplies of petroleum. Hydroelectric potential convenient to population centers and industrial sites has for the most part already been tapped. The development of nuclear capability is proceeding, but it will be a number of years before it can be widely implemented.

Biomass conversion, on the other hand, appears to be a feasible alternative for large-scale energy production in the future. Brazil has already had considerable success in converting sugarcane and other tropical crops to alcohol. Because the Brazilian alcohol conversion program is so unique, Chapter Five of this study discusses PROALCOOL in more detail.

'AGRICULTURAL TRADE

Brazil ranks as the third largest exporter of agricultural commodities in the world, behind only the United States and France. Its exports of coffee and frozen concentrated orange juice are the world's largest. It ranks as the No. 2 supplier of cocoa and soybeans and is fourth in the world in exports of sugar and unmanufactured tobacco.

These superlatives tell only part of the story. Brazil is also a large and important supplier of a number of other agricultural commodities, among them processed meats, cotton yarn, poultry, castor oil, and peanut products.

Brazil-U.S. Trade

Brazil is a large import market for our agricultural products. Brazil traditionally is the largest U.S. wheat market in South

America and ranks among the top seven U.S. wheat import markets in the world. Wheat has accounted for the predominant share of U.S. agricultural exports to Brazil. Although emphasis has been given to boosting domestic production toward self-sufficiency, Brazil still cannot meet internal demand, which has been rising rapidly in recent years. As a result, U.S. wheat exports totalled \$364 million in 1980, and represented 53 percent of our total agricultural exports to Brazil.

Interest expressed by the Brazilian Wheat Board in obtaining Commodity Credit Corporation (CCC) financing led to the establishment in October 1980 of \$190 million worth of guarantees to U.S. exporters for sales of U.S. wheat to Brazil. This represented about 950,000 tons of wheat at current market prices. Wheat purchases from the United States in

have been live animals for breeding, temperate zone fruits and nuts, meat, and seeds.

Despite its vast land area, varied climatic conditions, and its rapidly developing agricultural sector, Brazil does not have a comparative advantage in the production of all of the agricultural products the country needs. Brazil is likely to remain dependent on imports to supply the local market during shortages of domestic production. When the balance of payments crisis eases, and as per capita incomes improve and consumer tastes and preferences change, Brazil is expected to become a significant import market for high-quality food products.

The relatively heavy dependence on imported wheat is also likely to continue for the near future. Despite attempts at

self-sufficiency, domestic production is expensive and is plagued by several serious problems, including marginal weather, disease attacks, and the lack of genetically adapted varieties.

Wheat consumption has been heavily subsidized in recent years through the sale of wheat to millers at prices considerably below the cost of acquisition. This had led to a rapid increase in consumer demand that consistently outstripped domestic production. In an attempt to dampen this demand and the resultant imports, the Government raised the price of wheat breads by 66 percent in February 1980. There may well be other moves toward reducing or eliminating the wheat subsidy. Demand is expected to increase in 1981, but at a declining rate of growth.

AGRICULTURAL POLICY

Since taking office in March 1979, the Figueiredo administration has emphasized agriculture as the priority sector of the economy. Policies have been formulated to meet the three-pronged mission assigned agriculture: (1) increasing production of food crops for domestic consumption and thereby reducing food imports; (2) expansion of foreign exchange earnings through the increased production of agricultural export commodities; and (3) production of crops for fuel purposes (i.e., the alcohol program). Continuing efforts are being made to increase productivity on existing farms and to expand the area under cultivation. In a departure from past policy, the Government has indicated its intentions to guide the agricultural economy, especially in the more prosperous south, to a greater reliance on the price mechanism rather than subsidized credit. The Government has also attempted to make a greater share of government financial resources available to the neediest farmers, who for various reasons have had trouble gaining access to that money in the past.

Areas of Concern

Certain problems must be tackled, however, in the course of expanding production. Storage and warehousing facilities are woefully inadequate. Storage capacity is especially deficient in more remote areas of the states of Goiás and Mato Grosso, but it is growing rapidly. In 1974 the Ministry of Agriculture created CIBRAZEM (Brazilian Storage Company) to coordinate the national storage system. The Figueiredo administration has continued to invest heavily in the expansion of the country's bulk, bagged, and refrigerated storage. These investments go hand in hand with government efforts to expand agricultural production and reduce between-harvest surpluses.

A considerable portion of this investment has been to finance storage at the farm level, so as to give the producer more protection and flexibility in the marketing of his output. In 1980, for example, PRONAZEM (the government-financed program to increase warehouse capacity at the farm level) financed 90 percent of the cost of an approved project in the north and northeast regions of Brazil for a period of 8 years at an annual interest rate of 10 percent. With the tightening of credit, interest rates in the future will be considerably higher.

According to CIBRAZEM data, the total installed storage capacity in Brazil in 1980 was 57.0 million tons, up 67 percent from the 1974 level. Of total capacity, about 61 percent was bagged storage and 39 percent was bulk storage. The relative mixture between bulk and bagged storage has been changing over the past several years, reflecting increased emphasis on moving towards bulk handling of commodities. The distribution of these facilities remains highly skewed along regional lines, with about 43 percent of the bagged capacity and about 80 percent of the bulk capacity located in the three Southern states.

The transportation infrastructure is also far less developed than the agricultural sector requires. It is also inappropriate, being based almost entirely on truck traffic. Building roads is costly considering Brazil's vast land mass and the difficult terrain in many places. The petroleum crisis means that fueling those trucks is even more expensive. Railroads are scarce and the huge network of waterways in the North is underutilized because the region's population is so thin.

In addition to being concentrated in the hands of a relatively few producers, credit applications have also concentrated on relatively few crops: coffee, sugarcane, soybeans, rice, and wheat, although these products are not all food staples. Even the place of rice in the list is somewhat misleading since rice often is planted for a year or two in the frontier regions before the land is switched to soybeans or pasture. Thus, a considerable portion of the credit granted for rice production has the indirect effect of preparing the land for export crops or livestock operations. Those farmers who do receive favorable credit have been able to modernize their operations rapidly.

Credit operations have had the effect of increasing the concentration of income and changing the composition of the rural work force from a reliance on resident labor to migrant laborers. Land values also have increased rapidly as a result of subsidized rural credit operations. In some cases, land is purchased as a means of obtaining credit, and to hedge against inflation, rather than as an investment in increased production.

The basic tax structure in Brazil also contains features prejudicial to increased production. Land taxes are very low, and favor land speculation and the withholding of productive land from farming. This has led to the condition that large areas in traditional producing regions lie unused while the expensive expansion of the frontier continues. Even in São Paulo, the most advanced state in Brazil, a significant portion of tillable land is still unused. Of this, the vast majority is part of latifundia (large land holdings).

Brazil's agricultural productivity levels are some of the lowest in South America. According to D. H. Graham and J. R. Mendonça de Barros,⁹ this is true for a number of reasons. Agricultural research efforts are weak, and exacerbating that situation, farming conditions differ so greatly that research done in one region does not easily transfer to other areas. The import substitution program, whereby farmers are urged to use domestically produced fertilizers, means that they are paying higher prices. As a result, fewer fertilizers are used and yields are lower.

In addition, economic policy efforts to manipulate production in favor of domestic self-sufficiency have often served to deter producers from expanding their output. Export controls, in particular, result in lower prices to farmers who then may cut back production in order to effect a more favorable price. On the other hand, efforts to promote exports of relatively more processed foods have subsidized processors at the expense of farmers, who are forced to sell raw commodities to them at low prices. Often, the farmers would obtain higher prices if they exported the goods at world price levels.

In order to achieve its policy objectives and to overcome the many obstacles to increased agricultural production in Brazil, the government uses a number of tools. Most frequently utilized are programs setting minimum price levels and providing loan assistance to farmers. In addition, regular devaluations of the cruzeiro help to maintain demand for agricultural exports, thereby encouraging farmers.

Minimum Price Programs

Each year before the planting season for a particular crop, the Brazilian Government announces a set of minimum producer support prices. The program is administered by the Production Financing Commission (CFP), an agency of the Ministry of Agriculture. As presently formulated, the key benefits of the program are that guaranteed support prices help farmers to make planting decisions, and adequate minimum prices year after year stimulate and maintain the expanded output of specific commodities. In addition, the program encourages the storage of excess production at harvest which can be released between harvests, provides a safety valve of government acquisition for periods of low prices, and protects consumers from excessively high prices through the release

For the 1980/81 crop season, the CFP approved minimum prices for 19 major commodities in late July 1980. The average increase for the group was 139 percent, compared with 68 percent the previous year. Because of the differences in planting and harvesting seasons, there are separate minimum price programs for the Center-West, and South, and for the North and Northeast. Minimum prices for the same crop may also differ, reflecting variations in production and transportation costs between the regions.

Operationally, the CFP employs two instruments to support its minimum price policies: the Federal Government Commodity Loan Program (EGF), and the Federal Government Commodity Acquisition Program (AGF). EGF provides loans to producers to hold their output, either in officially designated warehouses or in on-farm storage, until market prices improve. The basic functioning of the AGF involves the government's assumption of ownership of commodities placed under the EGF. In such cases, farmers opt to "sell" their commodities to the government by defaulting on EGF storage loans.

In its 1980 minimum price program, the Brazilian Government gave special emphasis to crops basic to the Brazilian diet. For example, prices for dry-beans and manioc were increased 194 and 146 percent, respectively. The goal of the new minimum price program, according to the Ministry of Agriculture, was to increase planted area by at least 7 percent. Assuming normal weather, the greater output from the increased acreage should provide more plentiful basic foodstuffs to Brazil's population. Special incentives given to the Northeast and small farmers are aimed at providing a better distribution of food supplies as well as increased quantities.

The CFP minimum price program does not cover wheat or the major tropical products—coffee, sugar, and cocoa. For wheat, the Bank of Brazil's Wheat Marketing Agency (CITRIN) annually sets a standard purchase price for the upcoming crop. At harvest, CITRIN buys the entire domestic wheat crop and resells it to mills at subsidized prices. For coffee, the Brazilian Coffee Institute (IBC) sets a minimum price and guarantees the purchase of all coffee produced for the season if market prices fall below that level. The Sugar and Alcohol Institute (IAA) annually sets quotas and a guaranteed price for sugarcane. Cocoa does not have an explicit minimum price program, although the Cocoa Research Organization (CEPLAC) operates national programs to support producers. Both the IBC and IAA are agencies of the Ministry of Industry and Commerce, while CEPLAC, like CFP, is an agency of the Ministry of Agriculture.

There is no comprehensive price program for livestock products. For beef, however, there is a "gentlemen's agreement" between the government, meat packers, and producers for setting the level at which beef will be sold in wholesale markets. Through the Brazilian Food Company (COBOL), the government sustains this price by purchases of beef for its regulatory stocks during the heavy slaughter season (December-July). These stocks are released for consumption during the light slaughter season.

Credit Programs

Subsidized credit has been one of the principal means of encouraging rapid development of the agricultural sector. In real terms, adjusted for inflation, interest rates of recent years have been very favorable — negative in fact. Policies of the Figueiredo Administration have sought to adjust the credit advantages given to the various parts of the agricultural sector. For 1981, the administration plans to increase lending to the rural sector but, at the same time, reduce the subsidy element in rural credit. It is understood that interest rates will be flat rates, rather than a mixture of interest and monetary correction as in the past. In addition, limits were placed on the proportion of production, investment, and marketing credit that farmers will be allowed to take at the preferential rates. Large producers will be limited to 60 percent, medium-sized farmers may receive 80 percent, and small farmers will still be allowed 100 percent of their requirements.

The basic objective of the new program is to provide greater financing assistance to small farmers in an attempt to reduce the income and regional disparities which exist within agriculture. In addition, greater market incentives are given to efficient producers while reducing their dependence on subsidized credit.

Cheap credit is extended to producers of about 35 storable commodities (excluding such commodities as cocoa, sugar, bananas, and coffee—the traditional tropical products). Many of these loans are granted under the auspices of special regional and sectoral development programs. Credit is made additionally attractive for investment loans by limited requirements for seed capital and, in some cases, by long grace periods before repayment begins. Another program insures repayment of 80 percent of bank loans in case of crop failure. These programs can be expected to contract rather than expand in the near future, however, as the government continues its battle against inflation.

Agricultural Administration and Special Programs

The responsibility for general agricultural policy formation, coordination, and implementation in Brazil is divided among several ministries. Most agricultural production and food supply programs are controlled by the Ministry of Agriculture. The Ministry of Agriculture also plays an important role in the formulation and administration of regional development programs, although the programs themselves are controlled by the Ministry of Interior. The Inter-Ministerial Council on Agricultural Prices and Supply under the Minister of Planning also wields power in these areas. The Ministry of Industry and Commerce controls coffee and sugar policies and also implements Brazilian import substitution legislation which is known in Brazil as the "law of similars". The Ministry of Finance has the final say on decisions related to price policy, controls foreign trade policy, and through the Bank of Brazil, is responsible for domestic wheat purchases. Interministerial policy coordination is dealt with in several policymaking councils such as the National Food Supply Council (CONAB), the Economic Development Council (CDF), and the National Monetary Council (CMN).

Agencies under the direction of the Ministry of Agriculture include the following:

The National Institute for Colonization and Agrarian Reform (INCRA) is responsible for settling pioneer farmers in the Amazon and other frontier areas, and for administering a few small-scale agrarian reform projects scattered throughout Brazil. INCRA is also responsible for the rural cadastral survey, the rural land tax, and rural land titling in general.

New government policy aims to distribute 100,000 land titles annually through INCRA, primarily in frontier areas. Past INCRA projects have included the colonization along the Cuiabá-Porto Velho highway in western Mato Grosso and Rondonia, a region where population has increased dramatically in recent years.

The Production Financing Commission (CFP) administers the minimum price program (see p. 6), using commercial banks and the national rural credit institutions for financial backing. This program has been of particular value in newly developed and remote agricultural areas, since it offers a marketing alternative to intermediaries who offer to buy production at prices below the minimum.

The Brazilian Agricultural Research Enterprise (EMBRAPA) works in conjunction with universities, state institutions, and private groups in the various regions of Brazil with the aim of increasing productivity in the agricultural sector. EMBRAPA operates with a large budget and has established 15 national research centers devoted to specific research topics.

EMBRAPA's priorities for the next few years are the development of better seeds, especially for basic food crops, new and more efficient techniques of fertilizing, and research on ways to take advantage of the agricultural potential of the Cerrados.

Past successes of EMBRAPA include the production of new corn hybrids, recommended for the Cerrados, whose yield is 40 percent greater than conventional hybrids. Progress has also been made in the development of manioc, sorghum, sugarcane, palm, and sweetpotatoes which can be used in the production of alcohol for energy.

The Brazilian Enterprise for Technical Assistance and Rural Extension (EMBRATER) coordinates state and federal extension programs. Most of its activities are directed at technical support for small producers, especially regarding the use of irrigation and organic fertilizers.

The Brazilian Food Company (COBAL) implements government food supply plans and programs. In order to meet these responsibilities, COBAL has authority to buy, sell, transport, import, and export agricultural inputs.

COBAL aims to reduce the margin of difference between the prices received by the producer and the price paid by the consumer through direct intervention in the marketing and distribution sector. Because of inefficient and obsolete marketing and distribution systems in Brazil, and due to government interference in the marketplace, this margin is

generally quite high. COBAL has concentrated its efforts in poor urban areas, where the problem of high food prices is most acute.

One of COBOL's noteworthy successes has been the organization of an efficient fresh produce marketing system in the large metropolitan centers. This was accomplished by setting up large central markets near all major cities. These modern marketplaces have eliminated much of the waste and inefficiency which used to plague distribution of fresh produce to Brazil's large urban centers.

The Brazilian Storage Company (CIBRAZEM) was established to expand and improve the warehousing infrastructure (see p. 5). Although still a problem, storage capacity has improved greatly in recent years. Goals now are to continue this expansion with particular attention to fishery and horticultural storage capacity, to onfarm warehousing, and to facilities in the frontier regions.

Regional programs, which fall under the direction of the Ministry of the Interior, provide incentives for the agricultural development of frontier or chronically low income areas. The principal tools of all the programs are investment credits at favorable terms for private investors. Credits are often for long terms, with grace periods, and at low interest rates. In addition, the programs usually include direct government investments in infrastructure, research, and extension.

One of the most important of these programs is POLOCENTRO, the special program for the development of the Cerrados. The Cerrados is an area of great agricultural potential if soil nutrient problems can be corrected. Already techniques to improve soil nutrients have been developed and millions of hectares of land have been put into agricultural production.

Another large scale project is POLONORDESTE, the Program for the Development of Integrated areas of the Northeast. Although an important agriculture exporter, the Northeast has lagged far behind the rest of the country in levels of economic development. POLONORDESTE claims a long list of achievements in granting credit to farmers, in issuing land ownership titles, and in building roads, schools, and other infrastructural projects. To date, however, POLO-

NORDESTE has had little impact on modernizing the land tenure system in the Northeast.

The POLOAMAZONIA program coordinates investments for mineral and agricultural development of the Amazon basin. SUDAM, a government development agency for the North, offers tax incentives for agricultural projects.

Other regional programs include PRODEGRAN, the Program for the Development of the Greater Dourados Region, which is in southern Mato Grosso State.

The Brazilian Government has also several programs to assist certain sectors of the agricultural economy. These programs, like the regional programs, depend mainly upon special lines of subsidized credit which are available to farmers, cooperatives, and agribusinesses.

The National Livestock Development Program (PROPEC) was formed in 1977 by merging five previously existing livestock programs. PROPEC provides farmers and ranchers with low-interest loans and technical assistance for improving pastures, dairy and beef breeding stock, and production techniques.

The Swine Development Program is aimed at improving pork production and marketing systems in southern Brazil. The program provides technical assistance for health and genetic improvement, finances the construction and modernization of slaughter plants, and attempts to establish new systems to support domestic and export marketing of pork and pork products.

The National Agricultural Limestone Program (PROCAL) offers low interest credit for investors establishing or expanding limestone crushing plants and to farmers who use lime. The National Agricultural Storage Program (PRONAZEM) provides long-term, subsidized financing for the establishment of grain and other agricultural storage facilities.

The National Alcohol Program (PROALCOOL) provides incentives for the production of alcohol for mixture with gasoline. This has become a high priority item in the Brazilian economy. PROALCOOL is described in more detail in chapter five.

TRADE POLICY

The objective of the Figueiredo Administrations foreign trade policies has been to boost exports and restrain imports so as to improve the overall balance of payments situation. Although the trade balance itself is not the most serious problem (Brazil had a deficit totalling approximately \$2.8 billion needs the foreign exchange to service

to keep the imbalance from deteriorating. Continued funding from international banks also depends in good part upon demonstrations by the Brazilian Government that serious internal measures are being taken to improve their trade balance position.

Consequently, in recent years trade policy has come to mean export incentive programs and increasingly restrictive import regulations. In addition, the Figueiredo Administration has continued a series of crawling-peg "mini-devaluations" of the currency, whereby the cruzeiro is devalued by several percentage points 15 to 20 times a year in order to compensate

for the difference between the high rate of Brazilian domestic inflation and the lower inflation rates of Brazil's principal trading partners and competitors. In December 1979, as part of the package of economic reforms, the cruzeiro was devalued 30 percent, known as the "maxi-devaluation".

Policy Administration

Foreign trade policymaking in Brazil is centralized under the National Foreign Trade Council (CONCEX), which was inaugurated in September 1979. An old CONCEX under the direction of the Ministry of Industry and Commerce proved to be ineffective. The new CONCEX is headed by the Minister of Finance, who has a more direct interest in foreign trade. Making up the Council are a number of prominent government officials and representatives of the private sector.

The first project assigned to CONCEX by President Figueiredo was to streamline the bureaucracy and legal structures related to foreign trade and to reduce government control over private commercial activities. In addition, a number of commissions have been created within CONCEX to advise on priority trade policy issues. These commissions will study ways to expand exports from various sectors of the economy.

Implementation of foreign trade policy is the responsibility of several Brazilian agencies. The most important is the Foreign Trade Department of the Bank of Brazil (CACEX) which is the agency responsible for issuing import licenses. In the past CACEX has been instrumental in limiting imports by restricting import licenses. CACEX also sets export targets for soybeans and grants export licenses.

The Brazilian Export Financing agency (FINEX) is under CACEX. CACEX itself is contained within the Bank of Brazil which is under the Ministry of Finance. Two other administrative agencies which are important in the implementation of trade policy are the Customs Policy Council (CPA) and the Export Incentive Program (BEFIEX).

CPA sets import duties and BEFIEX offers exemptions from import taxes on capital goods and equipment which are to be used in the production of other goods to export. A new department of the National Development Bank has been set up, called Finamex, which is modelled on the United States' Export-Import Bank. Its purpose is to finance the export of Brazilian-made capital goods and heavy equipment.

Export Policies

Export policy during Brazil's "economic miracle" years and up until late 1979 consisted of a variety of export incentives such as periodic devaluations, tax forgiveness and tax credits for exports, as well as heavily subsidized credit to cover export operation and production costs. On December 7, 1979, however, President Figueiredo announced a number of economic reforms, including many measures which dismantle the previous system of export incentives. In a speech publicizing these moves, the President declared that many of the former incentives had been too inflationary and would have to be abolished or reduced in scope. It was to mitigate somewhat the dampening effect of these changes regarding exports that the 30-percent devaluation of the cruzeiro was announced, to make Brazilian exports considerably less expensive abroad.

The Brazilian government now offers exporters several incentives, the most significant ones being tax-related. Two major value-added taxes are levied: the federal IPI (Tax on Industrialized Products) and the ICM (Merchandise Circulation Tax) collected by the individual states.

Goods that are exported are not subject to payment of the IPI tax. However, since the IPI is a tax on industrialized products, the exemption does not benefit exporters of unprocessed agricultural commodities. Many semi-manufactured and manufactured agricultural products do qualify for the tax forgiveness though including cocoa butter, instant coffee, crude and refined vegetable oils, and frozen concentrated orange juice.

In addition to the tax exemptions, the Brazilian Government also grants an IPI tax credit to exporters of certain commodities. This credit, equal to a percentage of IPI liability, can be applied toward the payment of IPI taxes on any other operations of the company. If necessary, the benefit can be shifted to subsidiaries or to suppliers of inputs, and in extreme cases can even be received in cash.

These IPI tax credits have long been a source of irritation to the United States and to other competitors of Brazilian goods who consider them to be unfair export subsidies. In order to conform to GATT standards, the Brazilian Government began a phase-out of the credits in mid-1979, to take place over a period of 4 years. In December 1979, the tax credits were eliminated altogether. In April 1981, the government reinstated the subsidies for many products and announced that the phaseout would continue according to the original schedule.

In some cases, exemption is also granted from the ICM if a product is to be exported. At other times, the ICM is used as a disincentive to export raw commodities, favoring processed exports through a much lower tax rate. For example, in the case of soybeans, raw beans are subject to a relatively high tariff, meal to a somewhat lower tariff, and oil to no tax at all.

The ICM, being a state sales tax, varies widely from state to state, ranging from 9.5 to 16 percent. As with the IPI, a tax credit for the ICM is granted for some exported products, but this benefit will be phased out by 1983.

Preferential financing is another important export incentive. Numerous agricultural products benefit from subsidized credit granted for the production of goods to be sold abroad. Traditionally, interest rates on these loans have been extremely low, but with recent government austerity measures interest rates have risen and are now much closer to commercial rates. There is still some government subsidization involved, however, and most importantly, the credit is easily available to exporters.

Reductions in or exemptions from corporate taxes also serve to encourage exports. In some cases, companies which sell their products abroad, or which finance domestic sales with long-term credits from international or foreign governmental

agencies, are eligible for these benefits. In addition, income tax deductions can be claimed for payments made to foreign banks or corporations for export promotion activities, royalty payments, or interest payments.

The government also sponsors trade fairs and other promotional activities in an effort to spur exports. A network of trade bureaus in several countries (including 10 in the United States) coordinates these operations and deals with specific requests from potential buyers.

In conjunction with the 1979 maxi-devaluation, the government instituted a series of export taxes. These taxes were levied to assure that the benefits of the devaluation were not transferred overseas through lowered prices for Brazilian goods. They were intended to be a transitional measure only and were subsequently lowered or eliminated. They are due to be completely phased out within 1 or 2 years. While the taxes are in place, they should generate substantial revenue for the Brazilian treasury.

In addition to these temporary export taxes, exporters of certain agricultural commodities (coffee, cocoa, and soybeans) are required to pay a certain percentage of their earnings for agricultural research and technical assistance. These "contribution quotas" are adjusted from time to time in response to world market prices.

Import Policies

Current import policy has for the most part been instituted within the past year or two, as part of the Figueiredo Administration's efforts to improve the balance of payments. The December 1979 package dictated major reforms in previous import policy and further restrictions have been imposed since then. The trend has been toward more stringent, complicated, and less transparent import procedures and it is expected that this will continue.

Most of these restrictions take the form of licensing requirements, financing demands, high tariffs, and outright prohibitions against certain products. Before the 1979 package, importers were required to place 100 percent of the value of imports on deposit with the government for 1 year at zero percent interest and without monetary correction (financial operations are generally indexed). This requirement was lifted on the premise that the devaluation would cancel any benefits gained from freeing up the deposit money. Imports that were not subject to the prior deposit regulation therefore became relatively more expensive.

In addition, the modifications announced in December 1979 also entailed a major revision of the Brazilian "law of similars" which prohibited the entry of products for which there was a domestically produced substitute. Higher tariffs, not "law of similars" prohibitions, are now the primary policy instruments called upon to achieve protectionist goals.

CACEX. Although it was originally intended to serve strictly for statistical and price control purposes, the *guia* is now used to restrict imports. The government has suspended the issuance of *guias* for a long list of items it considers to be non-essential. High on the list are processed foods, although other agricultural items have also been restricted.

Less explicit but equally limiting is the series of administrative delays experienced by applicants for *guias*. Dubbed "Operation Tortoise," bureaucratic reluctance to expedite the granting of permits serves to discourage importers.

Recently instituted was a program whereby importers of capital equipment, durable consumer goods, and chemical and steel products must find foreign financing for transactions valuing over \$100,000. This affects about 30 percent of total Brazilian imports. In addition, the tax rate on the purchase of foreign exchange for imports of goods and services (the IOF-Tax on Financial Operations) was raised from 15 to 25 percent. As a result, foreign export financing arrangements, such as those of the Commodity Credit Corporation of the United States, have become increasingly useful to the Brazilians.

Import tariffs in Brazil range from zero to 205 percent with the majority of goods bearing a duty from 15 to 55 percent. Tariffs have been edging upward since the mid-seventies when the balance of payments problems began to emerge.

When the maxi-devaluation of 1979 did not prove to counteract completely the effects of lifting the prior import deposit requirement, imports began to rise and another round of tariff hikes resulted. In the past year, duty rates have increased on approximately 1,500 items in the Brazilian tariff schedule. In addition to higher tariffs, temporary but indefinite import surcharges have been imposed on a number of products.

Quotas, too, are used to restrain imports. Importing firms have been told that their purchases in 1981 cannot exceed 100 percent of their 1980 total. Their 1980 quota was only 80 percent of 1979 imports. Furthermore, they must file an "import program" with CACEX, the Foreign Trade Department.

International Trade Commitments

Brazil is one of only a few Latin American members of the GATT, having joined in 1948. During the Tokyo Round of the Multilateral Trade Negotiation (MTN), Brazil negotiated for direct tariff concessions for a number of products, expressed interest in the formation of the Agricultural Cathedral (a small group of major world traders formed to discuss agricultural trade issues), and signed several of the MTN codes.

Previously negotiated tariff bindings by Brazil were principally on industrial goods, although tariffs on a number of agricultural goods were also bound. These include wheat, live animals, apples, pears, and raisins. During the Tokyo Round, Brazil agreed to concessions on walnuts, animal semen, and gelatin for pharmaceutical use. In turn, the United States

agreed to bind the duty on palm hearts, guava products, and certain sugar products. A list of these concessions appears in the appendix.

Problems in implementing the earlier concessions on the part of Brazil led to periodic Article 28 negotiations between the United States and Brazil. Talks began in 1967, but because Brazil was involved in similar discussions with other trading partners they were not concluded until 1978.

Early in the MTN talks, Commissioner Gundelach of the European Community suggested that it would be helpful to have a place where Ministers of Agriculture or their deputies could meet to consider aspects of their farm programs that have an impact on international trade, in order to help countries avoid taking actions which transfer the burden of their programs on to the export markets of other countries. Brazil was initially active in consultations concerning the Agricultural Cathedral, as this meeting place was called, and was supportive of the concept. Brazil continues to be committed to the project, and is working together with GATT contracting parties to formulate an Agricultural Cathedral that will receive support from developed and developing countries.

Brazil has signed the MTN codes on Subsidies, Anti-Dumping, and Standards, as well as the agreement on bovine meat. There has been much discussion about a possible signature on the Licensing Code, but it appears that the time constraints for issuing import licenses are too strict for Brazil.

Brazil's adherence to the Subsidies Code reduced or eliminated the countervailing duties being levied against certain Brazilian products in the United States. Most of these penalties were on subsidized industrial exports, but some agricultural products (i.e., castor oil) were also involved. Since the United States will not have to prove that a domestic industry is actually being injured by subsidized imports before a countervailing duty investigation can begin, there should be significantly fewer of these cases in the future.

The injury criterion also applies to anti-dumping cases. Brazil's signature on the Standards Code means that Brazil will not use product standards to discriminate against foreign goods, although the current balance of payments crisis will make it possible for them to circumvent this provision to some extent.

Brazil was a member of the Latin American Free Trade Association (LAFTA), an organization founded in 1960 for the purpose of establishing a free trade area for its 11 member nations. Although LAFTA was only partially successful in achieving its goals, Brazil did share numerous trade preferences with fellow LAFTA countries.

When the original LAFTA treaty expired in 1980, Brazil participated in the negotiation of a successor organization, the Latin American Integration Association (LAIA). LAIA is less ambitious in its hopes to achieve a full common market and does not require its member countries to extend

individual tariff concessions automatically to all members. Instead, member nations negotiate bilateral agreements with each other. As a transitional measure, Brazil and several other countries have extended LAFTA preferences through 1981. LAIA distinguishes between countries of different levels of development, Brazil falling into the most developed category along with Argentina and Mexico.

Brazil also participates in a number of international commodity agreements. It is a leading member of the International Coffee Organization (ICO) which seeks to hold coffee prices at an acceptable level by means of a quota system. The most recent 2-year agreement was negotiated in late 1980, and it distributed quotas based on historical market shares with the largest allotment going to Brazil.

The latest International Cocoa Agreement (ICCA) was negotiated in late 1980 and has not yet been ratified. The Ivory Coast, the world's largest producer, and the United States, the world's largest consumer, have to date refused to join. Brazil, the No. 2 producer nation, is an active member, but without the participation of the Ivory Coast and the United States the effectiveness of the ICCA is doubtful.

The International Sugar Agreement (ISA) administered by the International Sugar Organization (ISO) is a much more successful and viable commodity arrangement. Again, Brazil is a leading member. The ISA operates on a system of export quotas; the current 5-year agreement will expire December 31, 1982.

Brazil is also a member of the International Monetary Fund (IMF), The World Bank, and the InterAmerican Development Bank (IDB). The IDB in particular has been active in supporting efforts to develop Brazil's Northeast.

Brazil-U.S. Trade Relations

Brazil-U.S. trade relations are generally good, although problems do arise from time to time. These are discussed in regular meetings between high level Brazilian and U.S. Government officials. Among current issues are the following:

Apples and pears: Brazil was once an important market for U.S. apples and pears, but because of various trade restrictions, this market has diminished considerably in recent years. Currently, delays in issuing import permits are frustrating the efforts of U.S. exporters to ship the fruit to Brazil. Brazil has a global quota for apples and pears and in 1980 negotiations agreed to expedite the licensing procedure, but the delays have continued.

Hides and skins: In March 1980, the United States negotiated an agreement whereby Brazil agreed to remove its export embargo on cattle hides and replace it with an export tax of 36 percent. This was later lowered as part of another agreement in October 1980. The current export tax of 18 percent (which still severely restricts exports) is in effect until

October 1, 1981, when the agreement lapses. Although Brazil is meeting its commitments under the letter of the agreement, the intent of the accord was to release more hides for world consumption (thereby lowering prices), and this has not occurred to any appreciable extent.

Brazil is one of the major beneficiaries of the U.S. Generalized System of Preferences (GSP), receiving duty-free entry privileges for certain goods by virtue of its status as a developing country. In 1980, these duty-free imports from Brazil totaled \$442.3 million. Principal agricultural products represented in that figure include castor oil (\$180 million) and canned corned beef (\$66 million). Brazil's largest agricultural exports to the United States (coffee, sugar, cocoa) are gen-

erally not included in the GSP, but duty rates for those products are free or very low.

The GSP program is not a permanent one (it expires in 1984) and it has provisions for graduating countries from the list of beneficiaries as they move away from developing country status. So far, no country has lost eligibility, although many products from specific countries have exceeded "competitive need" limitations and have been excluded from GSP status. There has been considerable discussion, however, of "graduating" some countries from the list, and Brazil, as well as Hong Kong, South Korea, Taiwan, and Mexico are mentioned often in this context. A partial graduation for those countries occurred in March 1981.

ALTERNATIVE DIRECTIONS FOR AGRICULTURE

Facing both a domestic financial crisis over its balance of payments and prohibitively high world prices for imported petroleum, Brazil has developed a uniquely successful program to produce ethyl alcohol from agriculturally based raw materials.

The Brazilian National Alcohol Program (PROALCOOL) is aimed at increasing alcohol production in order to gradually replace oil derivatives and thereby reduce Brazil's great dependence on costly imported petroleum. PROALCOOL also seeks to promote several socio-economic goals, such as improved regional distribution of income. Since initiation of PROALCOOL in late 1975, Brazil has increased alcohol production from 556 million liters during the 1975/76 crop year (June/May) to 3.8 billion liters in 1979/80. PROALCOOL's target for 1985 is the production of 10.7 billion liters.

PROALCOOL is based on the following economic and social policy objectives:

- Savings of foreign exchange through substitution of imported fossil fuel;
- Growth of GDP through improved utilization of idle agricultural land and labor;
- Increasing demand for domestic industrial products for use in the expansion, modernization, and construction of alcohol distilleries;
- Reducing inequities of regional income concentration; and
- Reducing individual income concentration.

PROALCOOL plans to allocate the 10.7 billion liters in the following manner: (1) 6.1 billion liters of hydrous alcohol to fuel vehicles adapted to run on pure alcohol; (2) 3.1 billion liters of anhydrous alcohol to blend with gasoline in a 20:80 mix; (3) 1.5 billion liters of alcohol to be used in the petrochemical industry.

The Government of Brazil recognizes that the 1985 goal to produce 10.7 billion liters has two critical supply/demand implications. First, substantial expansion of sugarcane production will be required to reach the level of raw material supply needed for alcohol production. Second, the production of 900,000 alcohol-fueled vehicles by 1982, and the conversion of 270,000 gasoline-fueled vehicles to alcohol-fueled by 1982 will be needed to utilize the increasing supply of alcohol that will be available. Without a high level of coordination, serious supply/demand bottlenecks could jeopardize the program's ultimate success.

The addition of alcohol to gasoline—and even the use of pure alcohol as a vehicle fuel—dates back to the late 1920's in Brazil. The first resolution establishing compulsory alcohol addition to gasoline (at the 5-percent level) was in 1931. At that time, the Ministry of Agriculture was responsible for coordinating all phases of sugar and alcohol production. Also in 1931 two commissions were created: the Alcohol Motor Study Commission and the Commission to Support Sugar Producers. These two commissions were reorganized in 1933 as the Sugar and Alcohol Institute (IAA) under the aegis of the Ministry of Industry and Commerce (MIC). The basic mission of the IAA has been to promote an achievable balance in the production, consumption, and export of Brazilian sugar and alcohol. The IAA pursues these multiple objectives by each year establishing production goals, milling and distillery quotas, and export targets. In addition, the IAA has required that excess cane be converted directly into alcohol. IAA has also traditionally helped finance and promote the building of alcohol distilleries linked or adjoining existing sugar mills. With the aid of the IAA, alcohol-gasoline mixtures came into general use. Initially, the purpose of such mixtures was not the saving of petroleum, but rather the reduction in potentially price-depressing surplus sugar supplies.

In 1975, the Brazilian government established PROALCOOL. The broad objective of PROALCOOL when it was established was to increase alcohol production for fuel and industrial uses in order to replace oil derivatives as the primary source of Brazil's fuel. Despite the considerable progress since 1975 in boosting alcohol production, PROALCOOL was again reorganized in 1979. The reorganization aimed at improving the government's coordination and direction of PROALCOOL by establishing coherent long-term goals and divisions of responsibility.

Financing

In order to achieve its goal of 10.7 billion liters by 1985, Brazil will invest \$5 billion in PROALCOOL between 1981-1985. For 1981, the government has already appropriated \$1 billion to PROALCOOL'S budget, up 60 percent from the 1980 investment level.

The Government of Brazil is the largest supplier of capital for PROALCOOL, providing both credit and technological assistance. Concessional financing is very attractive for establishing distilleries and expanding crop production. This financing is currently split between the industrial and agricultural sectors.

Industrial sector financing includes 80 percent of the total cost of establishing distilleries or the modernization of old ones using sugarcane as the raw material. Financing of 90 percent is available for distilleries using alternative feedstocks (i.e. manioc). Interest rates vary from 3 to 6 percent, according to regions.

Interest rates of 2 percent are available for distilleries using other raw materials. Financing for all distillery projects is spread over a maximum of 12 years, with an initial 3-year grace period, and 40 percent annual monetary readjustment based on National Treasury Indexed Bonds (ORTN).

Concessional financing for the agricultural sector is split between financing investment costs (establishing sugarcane plantations or renewing old ones) and financing production costs. In both cases, financing of 100 percent of the cost of the project is available. In the case of financing investment costs, interest rates of 15, 21, and 26 percent, re-

spectively, are set for small-, medium-, and large-scale farmers located in the North/Northeast regions. For the Center/South, interest rates of 5 percent are set for all producers, plus 24 percent annual monetary readjustment. Financing also is spread over a maximum of 12 years, with a 3-year initial grace period. For production costs, producers in the North/Northeast pay interest rates of 10, 12, and 15 percent, respectively, for small-, medium-, and large-scale farmers. The Center/South producers pay 5-percent annual interest rates and receive 19 percent annual monetary readjustment based on ORTN. In all regions, financing of production costs is spread over a maximum of 1 year for sugarcane projects, and 2 years for manioc.

Production

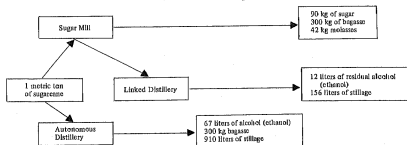
Sugarcane is the only feedstock now being utilized for commercial alcohol production. There are two methods of producing alcohol from cane: direct and indirect (see fig. 1). Under the first method, the raw cane is first crushed in a series of roller mills to obtain juice, which then undergoes a fermentation process. After additional steps, alcohol is distilled. Alcohol produced directly from sugarcane yields 67 liters per ton of cane. This distillation process also produces 13 liters of toxic waste or distillate per liter of alcohol produced.

Since the initiation of PROALCOOL in late 1975, Brazil has made considerable progress in increasing alcohol production. Alcohol output has increased from 556 million liters during the 1975/76 (June/May) crop year to 3.8 billion liters in 1979/80. Production quotas for alcohol for 1980/81 established by the IAA authorize alcohol production at a record 4.1 billion liters (about 700 million liters under the target previously established (see Table IV).

Alcohol is also obtained indirectly from sugarcane as a byproduct of sugar processing. The byproduct, molasses residue, is first diluted and then allowed to ferment. By this method 12 liters of alcohol are produced per ton of cane, as well as a small quantity of distillate.

Traditionally, alcohol was produced as a byproduct at sugar mills in linked distilleries. Prior to 1975, distilleries linked to

Production of alcohol from sugarcane



sugar mills provided about 90 percent of the alcohol production capacity. By 1985, it is expected that autonomous distilleries, those which are not part of a sugar mill complex, will produce over 60 percent of the nation's alcohol.

Production of alcohol is highly concentrated in Brazil. The largest alcohol producing region is the Center/South, particularly the state of São Paulo which accounted for 60 percent of the country's alcohol production during the 1979/80 crop year. For the 1980/81 crop year, the state of São Paulo will produce 67 percent of Brazil's alcohol. Two other important producing states are Pernambuco and Alagoas - both in the northeast. These two states combined will produce 14 percent of the country's alcohol output in 1980/81.

Basic Raw Material - Sugarcane

Brazil is the world's largest producer of sugarcane. Production during 1979/80 totalled 136 million tons. The goal for 1980/81 is to increase production by 3 percent to 140 million tons.

Production of sugarcane is concentrated mainly in the states of São Paulo, Rio de Janeiro, Pernambuco, and Alagoas. These four states account for 70 percent of total cane production; the state of São Paulo alone accounts for 44 percent. While the average productivity of cane in Brazil is 52 tons per hectare, yield in São Paulo averages 65 to 70 per hectare.

Although sugarcane is the only feedstock currently used for alcohol production, most of the cane is still used for sugar production. Based on sugar and alcohol extraction rates per ton of cane, it is estimated that 73.3 million tons and 52 million tons of cane were required for sugar and direct alcohol production, respectively, during 1979/80. Table 8 shows comparative data on area and production of cane for alcohol and sugar.

Alternate Raw Materials

Manioc - This starchy root is considered the principal alternative to sugarcane for alcohol production. Manioc (or cassava) is also a basic staple in the Brazilian diet. It is grown mostly by small farmers as a subsistence crop. The advantage of manioc for alcohol production is that it grows on depleted soils considered unsuitable for other crops. It can also be harvested throughout the year. Sugarcane, in contrast, requires good soils and fertilization for optimum yields and is a seasonally harvested crop.

Brazil is also the world's largest producer of manioc. Production in 1979 totalled 25.3 million tons. The area planted to manioc during 1979 is estimated at 20.1 million hectares, with average yields of only 12 tons per hectare. The current forecast for 1980 is 26 million tons. Nearly the entire crop is consumed as a food domestically. It is estimated that 60 percent of production is consumed unprocessed, while 40 percent is processed into flour. The potential alcohol extraction rate

liters of alcohol per day. Since the plant began operation in 1979 production has been at only 40 percent of capacity. To operate at maximum efficiency, the plant requires 370 tons of manioc daily. Because of low manioc yields (5 tons per hectare) on the 10,000 hectares allocated to the project, as well as poor transportation to the plant, the facility remains underutilized.

Eleven manioc-alcohol plants have been approved by the National Alcohol Council (CNAL). When the plants begin commercial operation in 1980/81, alcohol production from manioc is expected to reach 345 million liters or about 9 percent of total anticipated alcohol production.

Manioc for alcohol will be produced from large new plantings. The Government of Brazil does not intend to utilize existing production destined for direct human consumption. Although the average yield of manioc is low, it could increase sharply if fertilizer were used and improved plant varieties developed.

Sweet Sorghum - Sweet sorghum is emerging as one of the more promising raw materials for alcohol production. Its production cycle is short, about 120 to 135 days, making possible three crops a year from a given plot of land. From the stalk, which contains sucrose, it is possible to extract 70 liters of alcohol per ton, about the same as sugarcane. Sweet sorghum research in Brazil indicates that average productivity of 32 tons of stalk per hectare per year is practical. Hybrid varieties offer the potential for even higher yields.

Production of alcohol from sweet sorghum complements alcohol production from sugarcane from an economic point of view. Sweet sorghum allows maximum utilization of sugarcane distilleries, as the processing of sorghum is similar to that of sugarcane. Equally important, the government plans to process sorghum during the 4- to 6-month period when cane is not available and distilleries are normally closed. Utilization of sweet sorghum as an alcohol source would narrow this period to 1 to 2 months.

The Brazilian Agricultural Research Company (EMBRAPA) recently opened a model micro-distillery near Brasília to operate with sugarcane as well as sweet sorghum. Results have been considered good, and more of these facilities are being planned.

Babassu Palm - Babassu, a palm native to Brazil, grows wild throughout more than 14 million hectares in the dry, semi-deciduous forests that rim the Amazon basin. The state of Maranhão accounts for 65 percent of the total babassu area. The babassu palm produces an abundance of fruit, containing up to 72 percent oil. The oil traditionally has been used in soap manufacture and as a food. The hard shell makes an excellent fuel that is burned directly or converted into charcoal.

As for the potential production of alcohol from babassu, the National Institute of Technology (INT) has been conducting research on the mesocarp component of the babassu nut to extract starch. The extraction rate of alcohol from babassu is 80 liters per ton of nuts, compared with 180 liters per ton of manioc and 67 liters per ton of sugarcane. Currently, only

quantities of alcohol are produced from babassu in Ilhéus. Clearly, however, the potential of babassu as an alcohol source is significant. A major drawback, however, is the slow maturation. The babassu palm only begins to bear after 8 years and does not reach full production until 15 years after planting.

d - Production of alcohol (ethanol) from wood through hydrolysis process has tremendous potential owing to the forest resources in Brazil and the government's extensive reforestation projects. Three kinds of wood are being considered for use as alcohol sources: eucalyptus, babassu palm, and azeiteiro (a type of guinea tree). The latter two trees are common to the periphery of the Amazon basin and the northeast of Brazil, respectively.

The government has committed financial resources to support a project to produce ethanol from wood. The Brazilian Institute of Forestry Development (IBDF), Ministry of Agriculture, has established a public enterprise—Alcohol and Coke S.A. (COALBRA) to develop wood as a source of alcohol. COALBRA plans to build a \$25 million pilot plant owned initially, but to be converted to private ownership after 4 years) with production capacity of 100,000 liters of ethanol per day. The agricultural area to support this project is estimated at 20,500 hectares planted to eucalyptus for rotational cutting.

COALBRA's goal for 1990 is to produce annually 11 billion liters of ethanol from wood, and to construct 225 ethanol distilleries. Byproducts of these ethanol-wood distilleries would include the annual production of 1 million tons of molasses and 3 million tons of animal feed. To reach the 1990 goal it would be necessary to plant 5.5 million hectares to eucalyptus and other trees having potential as ethanol sources.

Alcohol Usage

The first phase of PROALCOOL calls for blending of up to 20 percent anhydrous alcohol (ethyl alcohol with all water removed) with gasoline. This blend was selected after extensive tests showed that automobile engines maintain desirable performance levels without modification when fueled with a blend containing up to 20 percent alcohol.

Figure 9 in the appendix shows the consumption of gasoline and alcohol on a national basis and the percent of alcohol in the blend since 1975.

The second phase of the alcohol program, hydrated alcohol (with 4 percent water content) would replace gasoline as fuel for spark ignition engines and provide up to an 80 percent blend for diesel engines. This phase is by far the most ambitious part of PROALCOOL. It requires coordination in the manufacture of alcohol cars, adequate production and distribution of hydrated alcohol, (i.e. placement of alcohol plants throughout the country), and incentives for Brazilians to buy alcohol cars and consume alcohol fuel.

The Figueiredo administration and the Brazilian Automakers Association signed a Protocol on September 19, 1979, for the production of 900,000 alcohol-fueled automobiles during

1980-82. The automobile industry production schedule for alcohol-fueled automobiles is 250,000 in 1980; 300,000 in 1981; and 350,000 in 1982. In addition, plans call for modification of about 300,000 existing cars to alcohol combustion.

With respect to engine modifications, the government has designated certain auto repair shops to adapt automobiles to run on straight alcohol, according to technical standards developed by the Aerospace Technological Center.

After conversion is completed, these shops must issue a "Certificate of Conversion to Alcohol." The certificates will allow users to fill their cars with alcohol fuel at any of the nation's alcohol pumps. As of March 1, 1980, only 52 repair shops had been accredited by the Federal Government to convert cars to the use of alcohol. Currently, Brazil's capacity to convert to alcohol is estimated at 8,000 to 10,000 cars per month.

Problems of a "black market" unfortunately have arisen with the modification of cars to use alcohol. In São Paulo repair shops not accredited by the government were found converting cars to use alcohol without utilizing official technical standards. These types of conversions are reported to be increasing the consumption of alcohol by as much as 200 percent. The government does not know how many cars have been illegally modified, but newspaper accounts estimate the number at over 10,000 cars in the state of São Paulo alone. Recently 16 stations in the state were closed for selling alcohol to users without the "Certificate of Conversion to Alcohol."

Currently fully alcohol-powered vehicles are being sold to the general public and not just to the government or taxi drivers, as was the case previously. Public purchase of alcohol powered cars is financed over 36 months, while conventional cars have financing terms limited to 12 months.

Drivers of alcohol-powered cars report that the problems are those of any car. However, owners do complain that alcohol increases fuel consumption 20 to 25 percent and that alcohol tends to corrode fuel lines and carburetor parts. Engineers report that the alcohol-adapted engine will require some years to be perfected. However, both Brazilian authorities and automakers remain confident that the public will buy the alcohol cars in large numbers.

the 5-percent level, can successfully be used as a substitute for diesel oil in diesel-powered vehicles. The government has authorized IPT, USP to begin production of this additive.

Various research organizations have been conducting work on vegetable oil for use in diesel engines. To date, research has been successful in mixing vegetable oil with diesel oil up to the 30 percent level. Vehicles running on 100 percent vegetable oil are being tested. The Aerospace Technology Center believes that the Black Marmeleiro tree is a perfect substitute for diesel oil. Black Marmeleiro wood (a shrub/tree native to the Northeast of Brazil) is foreseen having a dual purpose: (1) its extracted oil (about 50 kilograms per ton of wood) can be used as a diesel substitute, and (2) after undergoing acid hydrolysis it can produce alcohol (about 150 liters per ton of wood). According to the Government of Ceará State, there are about 6 million hectares of Black Marmeleiro in that state alone. This represents potential alcohol production of 9 billion liters, 10 million tons of charcoal, and 2.4 billion liters of vegetable oil. The program for Black Marmeleiro is now entering its industrial development phase, with a pilot plant currently being installed near Fortaleza, capital of Ceará State.

Two other important potential sources for diesel oil substitution are coconut and palm oil. In Brazil, palm oil is found mainly in the northeastern state of Bahia. However, the great potential area for expansion is in the Amazon, where large projects are now being implemented. Palm oil can produce an average of 3 to 5 tons of oil per tree during 25 years of life. The coconut contains 60 to 65 percent oil.

Research is also being undertaken to evaluate the production of diesel oil substitutes from peanuts, soybeans, cotton, sunflower, rapeseed, and avocados. Table 10 in the appendix shows the major characteristics of vegetable oils as compared with diesel oil. However, observers foresee two major problems with the program: (1) difficulties in storing production, because heat and humidity combined with bacteria can denature the oil, thereby making it inappropriate for fuel purposes; (2) vegetable oils now and for the foreseeable future are high priced and can probably be more profitably sold as edible oils.

Costs and Prices

IAA sets alcohol prices as a function of the market price for sugar by establishing a so-called parity price (the number of liters of alcohol which are equal in price to a given quantity of refined sugar). Currently, this ratio is 39 liters of alcohol per 60-Kilogram bag of sugar. The parity price varies according to region and types: (a) North/Northeast: anhydrous alcohol - 16.44 cruzeiros per liter; hydrated alcohol - 14.82 per liter, (b) Center/South, anhydrous alcohol - 16.37 per

plans to keep the consumer price of alcohol about 40 percent below the consumer price of gasoline. In July 1980, gasoline sold for 38.00 cruzeiros per liter while alcohol sold for 18.20.

Exports

Brazil is at times a significant exporter of alcohol, when production is in excess of demand and storage capacity. Brazil's ethyl alcohol exports increased from 4 million liters in 1977 to 110 million liters in 1979, but have dropped sharply in recent months.

Traditional markets for Brazilian alcohol are the European Community and Japan. Recently, the United States has become a major importer of Brazilian alcohol. The United States imported 10,000 liters of alcohol in 1977 from Brazil, none in 1978, and 6 million liters in 1979. During the month of January 1980, alone, the United States imported 6.4 million liters of alcohol from Brazil. That surplus of alcohol for export from Brazil was due to the significant expansion in the production and distillation sectors, but slower growth in the transportation, storage, and distribution infrastructure. Utilization was further hindered by the recent auto industry strike which reduced output of alcohol-powered cars.

This current surplus of alcohol has already begun to disappear, as Brazil's automobile industry meets its production schedule of alcohol-powered cars and increasing numbers of the current auto fleet are adapted to use alcohol fuel.

Impact of the Alcohol Program on Brazilian Agriculture

In order to reach the goal of 10.7 billion liters of alcohol by 1985 and maintain its current sugar production level, Brazil will need to plant an additional 3.5 million hectares to sugarcane. This needed increase in planting would push acreage to about 6.1 million hectares by 1985, more than double the 2.6 million hectares planted in 1980.

Most government and private observers believe that Brazil has a more than adequate land potential on which to expand its alcohol program. They look to the Cerrados in central Brazil and the Amazon basin as areas of tremendous potential. However, other more cautious observers are concerned about the problems PROALCOOL has begun to create in the state of São Paulo and in the Northeast of Brazil where the alcohol program has begun to encroach on agricultural areas traditionally used for annual food and fiber crops. Since the soil required for the cultivation of sugarcane must be relatively rich, conflicts can arise in land use between food and fuel crops. Such conflicts already exist in the state of São Paulo, which accounted for about 60 percent of the alcohol production during 1979/80. During 1975-1979, the sown area in São Paulo increased 12 percent from 5.0 to 5.6 million hectares. In the same period, land used to grow sugarcane increased 36 percent from 885,000 to 1.2 million hectares. According to São Paulo's state government, much of the increase in sugarcane area was met by converting pasture areas, and land devoted to food and commercial crops into sugarcane production.

Government sources deny the possibility of sugarcane crowding out food crops. They contend that in São Paulo 1.5 million hectares are available to expand production for

alcohol. However, other observers believe that if state authorities attempt to produce 7.0 billion liters of alcohol in São Paulo by 1985, the land required will be 2.5 million hectares rather than 1.5 million hectares. These observers contend that the additional 1.0 million hectares can only be found by crowding out pastures, cotton, peanuts, corn, and rice. Table 11 in the appendix shows the change in area planted to certain crops in the state of São Paulo from 1975-79.

According to CENAL, 900,000 hectares in several states are committed to the alcohol program for projects already approved, but not yet implemented. About 41 percent of this committed area to PROALCOOL is in the state of São Paulo.

Even if Brazil has the land potential for increasing production of sugarcane as well as other crops, there are concerns that subsidized alcohol producers with guaranteed government markets will displace food production in some areas. Some observers believe that the future demand for land resources from the sugarcane/alcohol sector will affect the level of production of basic foodstuffs (corn, rice, manioc, etc.), as well as export commodities (peanuts, coffee, soybeans, and orange juice). The planned use of manioc as a major source for PROALCOOL, for example, could reduce the availability of manioc as a food staple. Also, some coffee producers in northern Paraná State have shifted to sugarcane not only because of recurring climatic problems (i.e., frosts) but also because of unfavorable government policies. Another important export commodity, orange juice, is being restrained to a degree in its expansion by competition from sugarcane in the State of São Paulo. The coastal grass zone in the Northeast of Brazil is almost entirely occupied by sugarcane plantations and new expansion of cane is taking place in irrigated areas of the Northeast's vital São Francisco Valley. These two fertile areas in the semi-arid Northeast could have been used to produce increased quantities of foodstuffs for this chronically impoverished region of Brazil.

It is important to remember that the area in crops increased from 32.5 million hectares in 1969 to 49.6 million hectares in 1979. Assuming that the Figueiredo administration will continue to give high priority to agriculture, observers estimate that the cultivated crop area will increase to between 63 to 65 million hectares by 1985. A sugarcane acreage alone of

6.1 million hectares in 1985 will then represent 9.5 of total crop acreage, compared with 5.2 percent in 1980.

Although most observers do not discount the vast land potential existing in Brazil, new land must be brought into production not only for fuel crops, but also for food crops to feed the country's growing population.

Outlook

PROALCOOL has been underway for only a little over 4 years. Despite this relatively short time, certain program trends are becoming evident. It is fairly clear now that the initial target of a nationwide rate of 20 percent alcohol mixed with gasoline was achieved in 1980. Also, the production of 3.8 billion liters of alcohol during the current year assured Brazil the level of fuel needed to initiate mass production of alcohol-powered automobiles in 1980.

The Government of Brazil has given top priority to the alcohol program. Production of alcohol is now under the aegis of the National Energy Program. Despite this recent reorganization of the diverse responsibilities of PROALCOOL, there are a number of unresolved issues and problems confronting the program's planners and managers.

These include the issue of inequities in regional income distribution. Sixty-six percent of distilleries in use or authorized are in the Center-South. Sixty-eight percent of production capacity is in the state of São Paulo. Although one of the goals of PROALCOOL is to help re-distribute income, it seems to be having the opposite effect. Another potential problem of the program is its dependence upon the unpredictable world price of sugar. Low world sugar prices in the past few years have played a large part in maintaining a good supply of sugar available for alcohol conversion. High prices could seriously reduce that supply. The biggest unanswered question about the PROALCOOL program is that of food crop/fuel crop competition for land. However, the government's high-priority attention to the expansion of food production for domestic consumption and for export indicates that any trend toward conversion to fuel crops at the expense of food will not occur without serious consideration by government planning authorities.

Table 1.—U.S.-Brazilian exchange rates, 1975-81

Year	June 30	Dec. 31
	— Cruzeiros per dollar —	
1975	8.070	9.070
1976	10.800	12.345
1977	14.350	16.050
1978	18.080	20.920
1979	25.975	42.330
1980	52.115	65.170
1981	85.800	

¹ June 5.

Source: Banco Central de Brazil.

Table 2.—U.S.-Brazilian trade, 1978-80

Item	1978	1979	1980
	— \$ Billion —		
Total	2.981	3.442	4.344
U.S. exports	2.826	3.119	3.715
U.S. imports	.155	.323	.529
U.S. surplus			
Agricultural			
U.S. exports	.534	.536	.680
Proportion wheat & corn (percent)	90	79	90
U.S. imports	1.537	1.503	2.019
Proportion major tropical products (percent)	80	77	82
Brazilian surplus	1.003	.967	1.339

Source: Census Bureau, U.S. Department of Commerce.

Table 3.—Brazil's trade with the world, 1978-80

Item	1978	1979	1980
	— \$ Billion —		
Total trade	13.7	17.9	23.1
Imports	12.7	15.2	20.2
Exports	26.4	33.1	43.3
Total	(1.0)	(2.7)	(2.9)
Deficit			
Agricultural trade			
Imports	1.2	1.6	2.0
Share of total imports (percent)	8.8	8.9	¹ 8.7
Exports	6.8	7.3	¹ 9.4
Share of total exports (percent)	53.5	48.0	46.5
Total	8.0	8.9	11.4
Surplus	5.6	5.7	7.4
Agricultural trade as share of total trade (percent)	30.3	26.9	26.3

¹ Preliminary.

Source: U.S. census data, CACEX.

Table 4.—Brazil's agricultural exports by commodity group, 1975-80

Commodity	1975	1976	1977	1978	1979	January-November	
						1979	1980
U.S. \$ Billions							
Tropical products	2.56	3.27	4.10	3.71	3.90	3.29	4.65
Coffee, cocoa, sugar, molasses, carnauba wax							
Oilseeds and products	1.43	1.95	2.32	1.72	1.91	1.88	2.33
Soybean, peanuts, castor, babassu meal and oil							
Tobacco and cotton . . . . .	.36	.29	.42	.48	.55	.51	.55
Animal products . . . . .	.22	.34	.38	.37	.49	.45	.61
Meat, wool, hides and skins							
Floricultural products . . . . .	.17	.17	.26	.49	.49	.41	.46
Bananas, nuts, orange juice, other fruits and juices							
Grain . . . . .	.16	.19	.23	.01	(¹)	(¹)	(¹)
Corn, corn meal, rice							

¹ Less than \$50,000.

Source: Agricultural Attaché reports, U.S. Embassy, Brazil.

Table 5.—U.S. agricultural exports to Brazil, 1978-80

Commodity	1978	1979	1980
\$ Thous.			
Wheat and wheat flour	348,965	237,370	363,964
Corn	132,471	187,577	249,569
Pulses	359	3,780	11,504
Tallow and greases	—	4,136	9,094
Rice	6	2,370	7,293
Vegetables and preparations	5,611	6,234	7,169
Sugar and tropical products	7,102	6,996	6,196
Seeds	6,006	6,405	5,866
Other livestock products	3,576	5,123	5,818
Other poultry products	2,369	2,883	4,789
Soybean oil	—	44,932	2,650
Live animals	1,808	3,756	1,801
Soybeans	19,936	18,196	3
Other	5,371	6,212	4,905
Total	553,580	535,990	680,421

Source: Census Bureau, U.S. Department of Commerce.

Table 6.—U.S. agricultural imports from Brazil

Commodity	1978	1979	1980
\$ Thous.			
Coffee	827,064	598,854	1,054,462
Sugar	90,311	244,220	409,987
Cocoa beans and chocolate	319,429	313,150	198,156
Other beef and veal	34,921	48,972	81,277
Other fruit, nut, and vegetable products	48,063	54,542	72,293
Orange juice concentrate	99,278	103,630	64,753
Castor oil	28,648	30,394	38,637
Tobacco	25,405	37,317	31,346
Spices	22,902	19,150	14,911
Other sugar and tropical products	11,587	15,567	15,920
Other oilseeds and products	11,073	14,493	13,908
Other	18,103	22,972	19,135
Total	1,536,784	1,503,291	2,018,785

Source: Census Bureau, U.S. Department of Commerce.

Table 7.—Brazil's tariff concessions under GATT

Brazilian tariff schedule number	Description	Bound ad valorem tariff rate
01.02.01.01	Breeding cattle	0
01.02.02.00	Buffaloes, except for breeding	0
01.03.01.00	Swine for breeding	0
01.05.01.01	Day old chicks	0
01.05.02.01	Day old turkeys	0
01.05.03.01	Day old guinea fow	0
03.02.01.04	Codfish; dried, salted or in brine	0
03.02.02.01	Smoked herring	50
03.02.02.03	Smoked cod	0
03.02.99.00	Fish: dried, salted, in brine, or smoked, n.s.p.f., ex. cod filet	0
04.02.02.01	Dried whole milk, min 26% fat	35
04.02.02.02	Dried skimmed milk w/less than 26% fat except infant formula	35
04.02.02.03	Dried milk for infant formula, acidic	12
04.05.01.01	Dried milk for infant formula, not acidic	12
05.04.01.00	Fresh eggs for incubation	0
06.01.99.00	Calves' rennet	5
	Bulbs, tubers, tuberous roots, corms, crowns, rhizomes, decumbent in growth or in flower -except non ornamental plants -except begonia, gladioli or "gladiolus" -except bulbs of other flowers	0
07.01.07.00	Fresh or refrigerated potatoes for planting, except sweet potatoes and certified seed potatoes	0
07.05.01.01	Pea seeds, for sowing	32
07.05.01.99	Pea seeds, other	32
08.01.01.00	Dried dates	20
08.04.01.00	Fresh grapes	32
08.04.02.00	Raisins	32
08.05.04.01	Walnuts, in shell	32
08.05.04.02	Walnuts, shelled	60
08.06.01.00	Fresh apples	¹ 15
08.06.02.00	Fresh pears	¹ 15
08.12.02.00	Prunes	32
09.05.00.00	Vanilla	30
09.06.01.00	Cinnamon: raw or in shell	30
09.07.01.00	Cloves, raw	30
09.08.01.00	Nutmeg	50
09.08.02.00	Mace	50
09.09.05.00	Cumin seeds	50
10.01.01.00	Wheat, with husk	¹ 0
12.01.05.00	Linseed, except certified seed for sowing Seeds, spores & fruit, of a kind used for sowing: of fruit trees of flowers of vegetables grass	0
12.03.01.00		0
12.03.04.00		0
12.03.05.00		0
12.03.06.00		0
12.06.01.00	Hop cones and lupulin, cones or flowers, green or dry	8
13.03.01.00	Shellac	50
13.03.03.01	Agar-agar	15
15.04.01.02	Cod liver oil - refined, except in bulk	10
23.07.02.00	Blended complete animal feeds, includes those w/vitamins or antibiotics.	15
24.01.01.01	Cigar wrappers	20

¹ Quantitative restrictions on bound duty rates.

Source: U.S. Department of Agriculture.

Table 8.—Brazil's area and production of cane for alcohol and sugar, 1975-80¹

Crop years (June/May)	Area harvested for: direct alcohol/sugar		Production of cane for: direct alcohol/sugar	
	— 1,000 Ha —		— 1,000 tons —	
1975/76	36	1,453	1,620	65,411
1976/77	66	1,668	3,168	80,088
1977/78	200	1,775	10,400	92,300
1978/79	360	1,339	29,680	81,577
1979/80 ²	1,000	1,410	52,000	73,333

¹ Area estimated by Agricultural Attaché using average yields of 52 tons per hectare. Production of cane for sugar based on IAA sugar production statistics and sugar extraction rate of 90 kg per ton. Production of cane for alcohol based on alcohol extraction rate of 67 litres per ton.

² Estimated.

Source: Agricultural Attaché reports, U.S. Embassy, Brazil.

Table 9.—Brazil alcohol usage in gasoline

Calendar year	Gasoline	Anhydrous alcohol	Total gasoline and alcohol consumption	Annual proportion of alcohol content in gasoline
	— Millions Liters —		— Percent —	
1975	14,619	162	14,781	1.10
1976	14,624	172	14,796	1.16
1977	14,103	639	14,742	4.33
1978	13,738	1,430	15,168	9.42
1979 ¹	13,307	2,300	15,607	14.75
1980 ²	12,800	3,300	16,100	20.49

¹ Estimate by Agricultural Attaché.

² Forecast.

Source: CNP and Agricultural Attaché estimates.

Table 10.—Principal characteristics of vegetable oils as compared with diesel oil

Fuel	Density	Viscosity	Calorific power Kcal/kg
Diesel	0.83	36	10,200
Soybean	0.92	161	8,800
Cotton	0.92	172	8,300
Babam	0.92	143	8,430
Coconut	—	—	8,680
Palm oil	—	—	9,230
Black marmeleiro	0.82	39	9,000

Source: CNE.

Table 11.—Change in sown area of ten major crops in the State of São Paulo, 1975-79

Crop	Thous. hectares
Sugarcane	+352
Cotton	+112
Peanuts	-3
Rice	-164
Corn	-236
Drybeans	+71
Soybeans	+201
Coffee	+142
Orange	+104
Pasture	-247

Source: Institute of Agricultural Economics (IEA), State of São Paulo.

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